U.S. Energy Information Administration

‹ Countries

Iraq

Last Updated: April 2, 2013 (Notes)

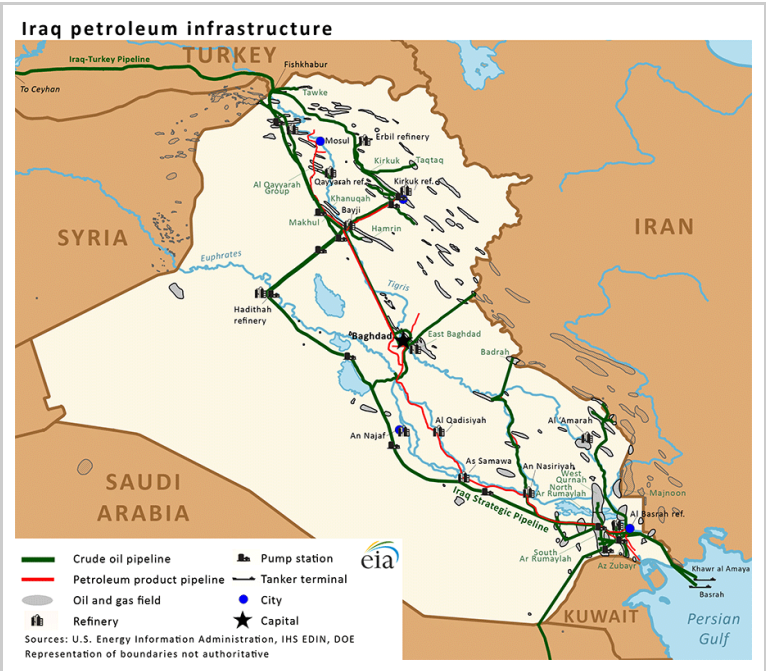
full report

Overview

Iraq has the fifth largest proven crude oil reserves in the world, and it passed Iran as the second largest producer of crude oil in OPEC at the end of 2012.

Iraq was the world's eighth largest producer of total petroleum liquids in 2012, and it has the world's fifth largest proven petroleum reserves after Saudi Arabia, Venezuela, Canada, and Iran. Just a fraction of Iraq's known fields are in development, and Iraq may be one of the few places left where much of its known hydrocarbon resources has not been fully exploited. Iraq's energy sector is heavily based on oil. Over 90 percent of its energy needs are met with petroleum (2010 estimate), with the rest supplied by natural gas and hydropower.

Iraq has begun to develop its oil and natural gas reserves after years of sanctions and wars, but it will need to develop its infrastructure in order to reach its production potential. According to estimates by Iraq's Deputy Prime Minister for Energy, capital expenditures of $30 billion per year in Iraqi energy infrastructure are required to meet Iraq's production targets. Progress has been hampered by political disputes and the lack of a law to govern development of Iraq's oil and gas. The proposed Hydrocarbon Law, which would govern contracting and regulation, has been under review in the Council of Ministers since October 26, 2008, but has not received final passage.



Source: U.S. Energy Information Administration

Petroleum

Despite having large proven oil reserves, increases in oil production have fallen behind ambitious targets because of infrastructure constraints and political disputes.

Reserves

Iraq revised its estimate of proven oil reserves from 115 billion barrels in 2011 to 141 billion barrels as of January 1, 2013, according to the *Oil and Gas Journal*. Iraq's resources are not evenly divided across sectarian-demographic lines. Most known hydrocarbon resources are concentrated in the Shiite areas of the south and the ethnically Kurdish region in the north, with few resources in control of the Sunni minority in central Iraq.

The majority of the known oil and gas reserves in Iraq form a belt that runs along the eastern edge of the country. Iraq has five super-giant fields (over 5 billion barrels) in the south that account for 60 percent of the country's proven oil reserves. An estimated 17 percent of oil reserves are in the north of Iraq, near Kirkuk, Mosul, and Khanaqin. Control over rights to reserves is a source of controversy between the ethnic Kurds and other groups in the area. The International Energy Agency (IEA) estimated that the Kurdistan Regional Government (KRG) area contained 4 billion barrels of proven reserves. However, this region is now being actively explored, and the KRG stated that this region could contain 45 billion barrels of unproven oil resources.

Production

Iraqi crude oil production averaged 3 million barrels per day (bbl/d) in 2012, and Iraq passed Iran as OPEC's second largest crude oil producer at the end of the year. About three-fourths of Iraq's crude oil production comes from the southern fields, with the remainder primarily from the northern fields near Kirkuk. The majority of Iraqi oil production comes from just three giant fields: Kirkuk, the North Rumaila field in southern Iraq, and the South Rumaila field.

The Ministry of Oil oversees oil and gas production and development in all but the Kurdish territory through its operating entities, the North Oil Company (NOC) and the Midland Oil Company (MDOC) in the north and central regions, and the South Oil Company (SOC) and the Missan Oil Company (MOC) in southern regions. Production in the northern region controlled by the Kurdistan Regional Government (KRG) fluctuates because of disputes with the central Iraqi government, but independent assessments by FACTS Global Energy and the Middle East Economic Survey suggest that crude oil production capacity in the KRG could reach about 400,000 bbl/d by the end of 2013.

Development plans

Iraq has begun an ambitious program to develop its oil fields and to increase its oil production. Passage of the proposed Hydrocarbon Law, which would provide a legal framework for investment in the hydrocarbon sector, remains a main policy objective. Despite the absence of the Hydrocarbons Law, the Iraqi Ministry of Oil signed long-term contracts between November 2008 and May 2010 with international oil companies.

Under the first phase, companies bid to further develop giant oil fields that were already producing. Phase two contracts were signed to develop oil fields that were already explored but not fully developed or producing commercially. Together, contracts for both phases cover oil fields with proven reserves of over 60 billion barrels. If these fields were developed as initially planned, they would increase total Iraqi production capacity to almost 12 million bbl/d, or about 9 million bbl/d above 2012 production levels.

The contracts call for Iraq to reach this production target by 2017. However, these contracts are being re-negotiated to more modest levels, and Iraq is revising its production targets to 9.5 million bbl/d by 2017. However, even these revised targets may be overly optimistic, given delays in developing its energy infrastructure. Iraq has since held a third bidding round for natural gas fields, and a fourth round (with few bids submitted) for fields that contain predominantly crude oil. A fifth round has been scheduled in 2013 for the development of the 4-billion-barrel Nasiriya oil field in Thi-Qar province, together with the construction and operation of a new 300,000-bbl/d refinery.

Infrastructure constraints

Iraq faces many challenges in meeting the planned timetable for oil production. One of the major obstacles is the lack of an outlet for significant increases in crude oil production. Both Iraqi refining and export infrastructure are severely constrained, with bottlenecks preventing more crude oil processing. Iraqi oil exports are currently running at near full capacity in the south, while export capacity in the north has been restricted by sabotage, deteriorating pipelines, and the inability to receive more oil from the south of Iraq via a deteriorated Strategic Pipeline. Pipeline capacity would need to be expanded in any case to export significantly higher volumes. Progress has been slow because of political disputes between factions within Iraq, especially those between the central government in Baghdad and the Kurdistan Regional Government. Iraq also has disagreements regarding shared oil fields with Kuwait and Iran.

Production increases of the scale planned will also require substantial increases in natural gas and/or water injection to maintain oil reservoir pressure and boost oil production. Iraq has associated gas that could be used, but it is currently being flared. According to a report issued by the U.S. National Oceanic and Atmospheric Administration (NOAA), Iraq was the fourth largest natural gas flaring country in 2010.

Another option is to use water for re-injection, and while locally available water is currently being used in the south of Iraq, fresh water is a scarce commodity in the Middle East. Large amounts of seawater will likely have to be pumped in via pipelines that have yet to be built for the Common Seawater Supply Facility. It was estimated that 10 to 15 million bbl/d of seawater could be necessary for Iraq's original production expansion plans, at a cost of over $10 billion. ExxonMobil, which was originally assigned to lead the project, dropped out in 2012, putting these plans behind schedule. The engineering company CH2MHill was subsequently awarded management of the project in December 2012, but the final scope of the project won't be known until Iraq decides what its re-negotiated production targets will be. The IEA estimates that the project will not come online before 2017 at the earliest.

Furthermore, Iraq's oil and gas industry is the largest industrial customer of electricity in Iraq. Large-scale increases in oil production would also require large increases in electric power generation. However, Iraq has struggled to keep up with the demand for electricity, with shortages common across the country. Significant upgrades to the electricity sector would be needed to supply additional power. Although over 20 gigawatts (GW) of new generating

capacity are planned by 2015, delays in meeting projected targets would mean insufficient supply to meet the projected demands of the oil sector.

Results of bidding rounds

	Operators	2009 prod. 1,000 bbl/d	Target prod. 1,000 bbl/d	Target incr. 1,000 bbl/d	Reserves (billion bbl)
First bidding round (brownfields), June 29-30, 2009					
Rumaila	BP, CNPC	1,000	2,850	1,850	17.8
West Qurna, Phase I[1]	ExxonMobil, Shell	270	2,325	2,055	8.6
Zubair	Eni, Occidental, Kogas	205	1,200	995	4.0
Missan Group	CNOOC, TPAO	86	450	364	n/a
First round total		**1,561**	**6,825**	**5,264**	**>30**
Second bidding round (greenfields), December 11-12, 2009					
West Qurna, Phase II	Lukoil, Statoil [2]	0	1,800	1,800	12.9
Majnoon	Shell, Petronas	55	1,800	1,745	12.6
Halfaya	CNPC, Petronas, Total	3	535	532	4.1
Garaff	Petronas, JAPEX	0	230	230	0.8
Badra	Gazprom, KOGAS, Petronas, TPAO	0	170	170	0.1
Qaiarah	Sonangol	2	120	118	0.9
Najmah	Sonangol	0	110	110	0.9
Second round total		**60**	**4,765**	**4,705**	**32.3**

[1] ExxonMobil was asked by Iraq to choose between this project and its projects in the KRG.

[2] Statoil exited this project in March 2012.

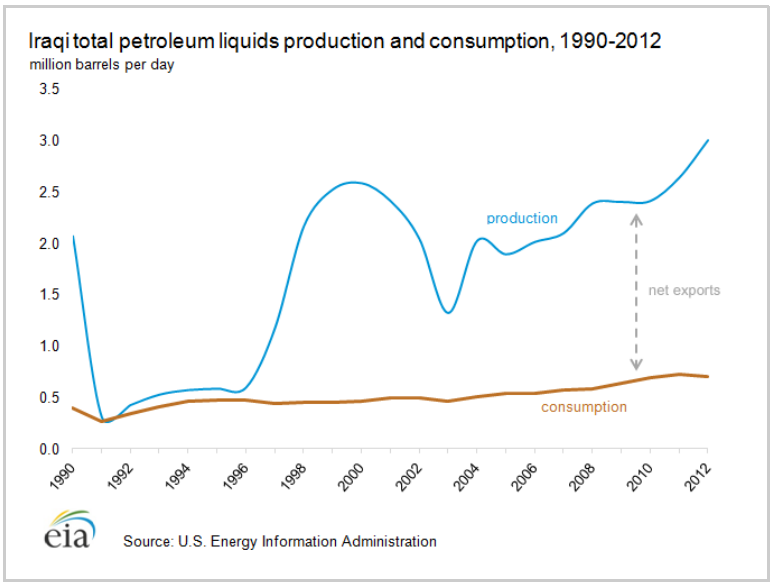
Sources: Special Inspector General for Iraq Reconstruction, Middle East Economic Survey, Iraq Ministry of Oil

Results of fourth bidding round May 30-31, 2012

	Operators	Hydrocarbon	Location
Block 8	Pakistan Petroleum	Oil/Gas	East central Iraq, 110 km east of Baghdad
Block 9	Kuwait Energy, Dragon Oil, TPAO[1]	Oil	Southern Iraq, 20 km north of Basra
Block 10	Lukoil, Inpex	Oil	Southern Iraq, southwest of Nassiriya
Block 12	Bashneft, Premier	Oil	between Najaf and Muthanna

[1] The Iraqi government has not signed a contract with TPAO and has asked Kuwait Energy to take over TPAO's share.

Source: Middle East Economic Survey, Iraq Ministry of Oil



Refining

Current Iraqi refining capacity is estimated at over 900,000 bbl/d, although estimates vary because effective capacity has fallen below nameplate capacity in many cases.

Existing refineries in Iraq

Refinery	Location	Nameplate capacity (bbl/d)	Notes
North Refining Company			
Baiji	North-Central Iraq	310,000	New Fluid Catatylic Cracker being installed
Haditha	North-West Iraq	16,000	
Kisik	North Iraq	10,000	10,000 bbl/d under contstruction
Kirkuk	North-East Iraq	30,000	
Qaiarah	North Iraq	20,000	Needs extension of pipeline
Siniya	North Iraq	20,000	
Midland Refining Company			
Daura	Baghdad	210,000	Needs extension of pipeline
Diwaniya	East of Najaf	20,000	
Najaf	Najaf	30,000	
Samawa	Najaf	30,000	
South Refining Company			
Basrah	Near Basrah	140,000	Adding 70,000 bbl/d
Missan	South-East Iraq	30,000	
Nassiriya	South-Central Iraq	30,000	
Kar Group (private)			
Erbil	Erbil	40,000	

Source: Middle East Economic Survey, FACTS Global Energy

Iraqi refineries produce too much heavy fuel oil relative to domestic needs, and not enough other refined products such as gasoline. To alleviate product shortages, Iraq set a goal of increasing refining capacity to 1.5 million bbl/d. Iraq has plans for four new refineries as well as plans for expanding the existing Daura and Basrah refineries.

Planned new refineries in Iraq

Refinery	Nameplate capacity (bbl/d)	Investment	Front end engineering contract
Nassiriya	300,000	$9 billion	Foster Wheeler
Kirkuk	150,000	$5.5 billion	Shaw Group
Missan	150,000	$5 billion	Shaw Group
Karbala	140,000	$5 billion	Technip
Total	**740,000**		

Source: Middle East Economic Survey, FACTS Global Energy

Kurdistan regional government issues

The Kurdistan Regional Government (KRG), the official ruling body of a federated region in northern Iraq that is predominantly Kurdish, has been involved in disputes with national authorities related to sovereignty issues. The plan by Iraq's North Oil Company to boost production at the Kirkuk field in North Iraq at the edge of the KRG region has been met with objections by the KRG, which insists that development plans at this field require KRG cooperation and approval.

More generally, the Iraqi Oil Ministry insists that all hydrocarbon contracts must be signed with the national government, and that all oil produced in the KRG region be shipped via SOMO, Iraq's oil exporting arm. However, the KRG passed its own hydrocarbons law in 2007 in the absence of a national Iraqi law governing investment in hydrocarbons. In late 2011, the KRG challenged the authority of the national government when it signed oil production sharing agreements with ExxonMobil to develop 6 blocks in northern Iraq, some of which are in disputed border areas. The KRG has since signed additional contracts with majors such as Chevron, Gazprom, and Total. ExxonMobil withdrew from some of its projects in Iraq, notably the Common Seawater Supply Facility, and the company had been asked by the Iraqi government to choose between its involvement in the West Qurna 1 oilfield and its projects in the KRG. TPAO of Turkey has also been asked to withdraw from its involvement in the Block 9 concession that was awarded during the fourth bidding round because of disputes regarding Turkey's involvement in KRG energy projects.

Another KRG oil dispute has revolved around exports of crude oil produced in the KRG region from earlier contracts. The KRG had agreed to send 175,000 bbl/d of crude oil into the Iraqi northern oil export pipeline. However, the KRG began reducing their contribution in late 2011, charging that the central government failed to make agreed payments to cover foreign oil company development. The KRG contributions were halted altogether in April 2012, but they were later re-started in August.

Oil exports directly from the KRG are another unresolved issue. The KRG began exporting

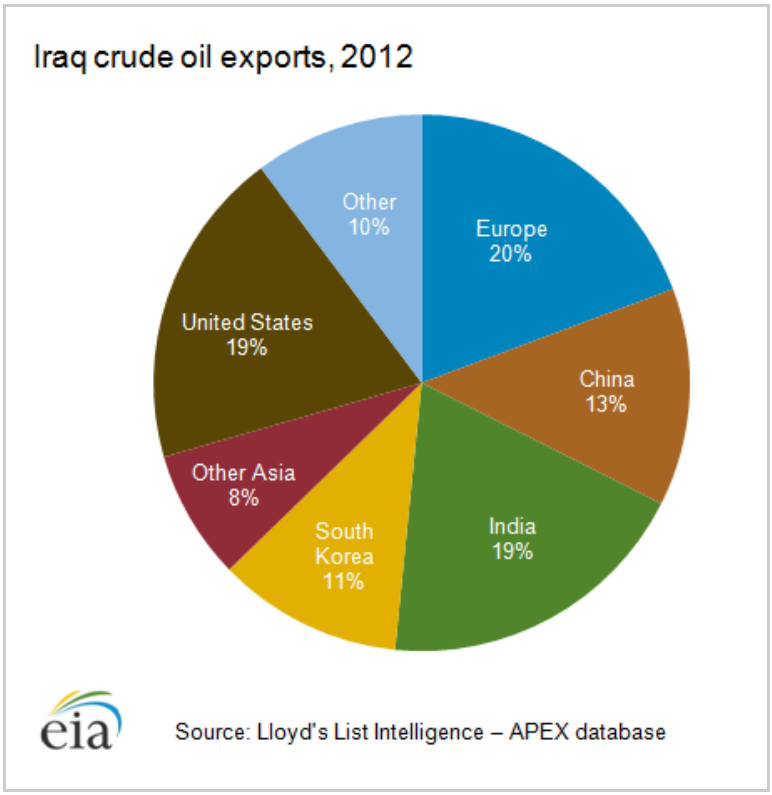
15,000 bbl/d of condensate and 20,000 bbl/d of crude oil to Turkey by truck. The KRG is looking at building its own pipelines to export crude oil directly via Turkey, bypassing the national export pipeline system, although Turkey has not officially agreed to this plan. Genel Energy plans to build the 420,000 bbl/d Kurdistan Iraq Crude Export (KICE) pipeline that will connect its fields in the Kurdish regions in northern Iraq to the border with Turkey. In addition, the KRG has explored supplying natural gas to Turkey.

The KRG has ambitious plans for its crude oil exports. KRG Prime Minister Mr. Barzani suggested that crude oil exports from the KRG could average 250,000 bbl/d in 2013 and then rise to 1 million bbl/d by 2015 and to 2 million bbl/d by 2019.

Oil exports

Iraq was the sixth largest net exporter of petroleum liquids in the world in 2012, with the majority of its oil exports going to the United States and to refineries in Asia.

Iraq exported 2.4 million bbl/d of crude oil in 2012, according to tanker data from Lloyd's List Intelligence. About 2.1 million bbl/d of these exports came from Iraq's Persian Gulf ports, with the rest exported via the Iraq-Turkey pipeline in the north. The majority of Iraqi oil exports go to the United States and to refineries in Asia, especially India, China, and South Korea.



Export pipelines

To the North:

- Iraq has one major crude oil export pipeline, the Kirkuk-Ceyhan (Iraq-Turkey) pipeline, which transports oil from the north of Iraq to Turkey's Mediterranean port of Ceyhan. This pipeline route consists of two parallel pipelines with a combined nameplate capacity of 1.65 million bbl/d. The Iraq-Turkey pipeline has been subject

to repeated disruptions, limiting exports from the northern fields. Furthermore, the parallel pipelines of the Iraq-Turkey route have deteriorated to the point where flows need to be routed back and forth between the two pipelines to bypass deteriorated sections. Only one of the twin pipelines is fully operational, with a maximum available capacity of 600,000 bbl/d, according to the IEA. Finally, in order for this pipeline to reach its design capacity, Iraq would need to receive oil from the south via the Strategic Pipeline. However, flows from the Strategic Pipeline have been severely limited, as it is also in need of repairs. Iraq and Turkey have held discussions on increasing pipeline capacity along this route.
- Proposals have also been made to build a 1-million-bbl/d pipeline to transport heavy oil via Turkey.
- The Kurdistan Iraq Crude Export (KICE) pipeline has been proposed to transport 420,000 bbl/d of crude oil from fields in the KRG to the border with Turkey.

To the West:

- The Kirkuk-Banias Pipeline, with a design capacity of 700,000 bbl/d, has been closed and the Iraqi portion has been unusable since the 2003 war in Iraq. Discussions were held between Iraqi and Syrian government officials about re-opening the pipeline. The Russian company Stroytransgaz expressed interest in repairing the pipeline, but this plan has not moved forward.
- Iraq has discussed building several new pipelines to reduce its over-reliance on exports from its southern ports. The first phase consists of building a 2.25-million bbl/d pipeline from Basrah in the south of Iraq northward to Haditha in Iraq's Anbar province. From there, Iraq has proposed building a 1-million bbl/d crude oil pipeline from Haditha to Jordan's port of Aqaba on the Red Sea, with Syria as another potential destination.

To the South:

- The 1.65-million bbl/d Iraq Pipeline to Saudi Arabia (IPSA) has been closed since 1991 following the Persian Gulf War. There are no plans to reopen this line, and Saudi Arabia has reportedly since converted it to a natural gas line.

Ports

The Basrah Oil Terminal (formerly Mina al-Bakr) on the Persian Gulf exported a little over 1.5 million bbl/d of oil in 2012. There are five smaller ports on the Persian Gulf, all functioning at less than full capacity, including the Khor al-Amaya terminal.

Iraqi oil production has been limited by the lack of sufficient export capacity. To address this problem, Iraq initiated the Phase 1 Crude Oil Export Expansion Project (ICOEEP), which envisions expanding Iraqi export capability to 4.5 million bbl/d by building three single-point mooring systems (SPM) with a capacity of 850,000 bbl/d each. The first two mooring systems were completed in 2012. However, exports have increased far less than anticipated because pumping to the SPMs is not coming from the refurbished Fao terminal as planned, but rather from a stop-gap diversionary pipeline. In addition, inadequate storage tank capacity has limited pumping from storage. Another SPM has since been planned to further increase export capacity.

Natural gas

The majority of Iraqi natural gas production is flared and Iraq was the fourth largest natural gas flaring country in the world in 2010. Iraq is taking steps to reduce flaring and to use its natural gas resources in power generation and for re-injection to increase oil recovery.

Reserves

Iraq's proven natural gas reserves as of January 1, 2013 were the 12th largest in the world at 112 trillion cubic feet (Tcf), according to the *Oil and Gas Journal*. Over 60 percent of these reserves lie in the south of Iraq. Three-fourths of Iraq's natural gas resources are associated with oil. The majority of non-associated reserves are concentrated in several fields in the North, including Ajil, Bai Hassan, Jambur, Chemchemal, Kor Mor, Khashem al-Ahmar, and al-Mansuriyah.

Production

Iraqi gross natural gas production rose from 81 billion cubic feet (Bcf) in 2003 to 660 Bcf in 2011. Some of this natural gas is used as fuel for power generation, while a portion of it is re-injected to enhance oil recovery. However, the majority of Iraqi natural gas production is flared. Flaring losses in some months have exceeded 60 percent of production, or more than 1 Bcf per day, due to a lack of sufficient pipelines and other infrastructure to transport it for consumption and export. As a result, Iraq's five natural gas processing plants, which can process over 773 Bcf per year, sit mostly idle.

To reduce flaring, Iraq signed an agreement with Royal Dutch Shell to create a new joint venture, Basrah Gas Company, to capture flared gas in Basrah Province. The 25-year project costing $17 billion has a planned production capacity of up to 2 Bcf per day. Under the agreement, processed gas would go to the state-owned South Gas company for domestic use. Any gas not bought for use by Iraqi power plants could be exported as LNG. The agreement, which originally was to cover all of Basrah province, has been modified to include only the associated gas from the Rumaila, Zubair, and West Qurna Phase I projects. Implementation of this agreement is necessary for the new oil development projects (which would use the natural gas for re-injection) to go forward.

Development plans

Iraq held its third bidding round in late 2010, for three non-associated natural gas fields (Akkas, al-Mansuriyah, and Siba) with combined reserves of up to 7.4 Tcf. Iraq has committed to purchasing 100 percent of the gas. A fourth bidding round in May 2012 attracted one bid for a gas-prone area. The Iraqi Ministry of Oil announced its intention to launch a fifth bidding round for exploratory areas with gas prospects in the future.

Results of bidding rounds

Gas Field	Operators	Estimated Reserves (Tcf)
Third bidding round, October 20, 2010		
al-Mansuriyah	Kuwait Energy, KOGAS, TPAO	3.3
Akkas	KOGAS. KazMunaiGas	2.1-4.0

Siba	Kuwait Energy, TPAO	0.1
Third round total		**5.5-7.4**

Fourth bidding round, May 30-31, 2012

Gas Field	Operators	Estimated Reserves (Tcf)
Block 8	Pakistan Petroleum	Not Available

Source: Middle East Economic Survey

Export/Pipeline plans

Plans to export natural gas remain controversial because natural gas is needed as a feedstock for Iraq's electric power plants. The current shortage of adequate gas feedstock has resulted in idle and sub-optimally-fired electricity generation capacity in Iraq.

Prior to the 1990-1991 Gulf War, Iraq exported natural gas to Kuwait. The gas came from the Rumaila field through a 105-mile, 400-MMcf/d pipeline to Kuwait's central processing center at Ahmadi. The Ministry of Oil has discussed reviving the mothballed pipeline, but no firm plans have been made to do this.

Other possibilities include:

- Developing northern export routes such as the proposed Nabucco pipeline through Turkey to Europe. In July 2009, Prime Minister Nouri al-Maliki suggested that Iraq could export 530 Bcf per year to Europe by 2015.
- Connecting the Iraqi gas grid to the existing Arab Gas Pipeline that connects Egypt's gas grid with those of Jordan, Syria, and Lebanon. Under this plan, gas would be delivered from Iraq's Akkas field to the Turkish border and then on to Europe.
- Building liquefied natural gas (LNG) export facilities in the Basrah region.
- Renewing plans to participate in the Friendship Gas Pipeline, which would transport natural gas from Iran through Iraq to Syria and then on to Europe.

Iraq's export plans have been complicated by KRG proposals to export their natural gas independently of Baghdad.

Electricity

After years of power shortages, Iraqi efforts to increase generating capacity are moving forward. Iraq plans to triple generating capacity to 27 gigawatts by the end of 2015.

Overview

Like many developing countries in the Middle East and North Africa, Iraq faces a sharply rising demand for power. For most of the postwar period 2003-2012, Iraq has struggled to meet its power needs. Daily outages lasting 16 hours per day have not been uncommon. Although Iraq purchased 74 turbines, for a total of 10 gigawatts (GW) of capacity in 2008, no

progress in installation was made until recently because of budgetary, contracting, and political difficulties. In addition, enhancements to the transmission and distribution networks are required to bring additional power to customers. A further bottleneck is that, while this power expansion is planned to be fueled primarily by natural gas-powered turbines, the natural gas infrastructure enhancements to support this expansion have lagged.

As a result, Iraq has had to import electricity from Iran and from Turkish electricity barges (floating power plants) in the Persian Gulf. In addition, there has been a large increase in the number of privately-owned generators, with those in Baghdad alone providing an additional 1 GW of capacity.

Development plans

The Ministry of Electricity is the Iraqi agency responsible for electricity generation, transmission, and distribution. Dr. Abd 'Abd al-Satter, Director General at the Ministry, said that Iraq could triple its generating capacity to 27 GW by 2015. Most of the turbines for this expansion were purchased several years ago, and over 20 new contracts have been signed for construction of power plants. In addition, Iraq plans to spend an additional $27 billion over the next five years, with about half of the money to be spent on upgrading the transmission and distribution systems. Chinese firms will build 3.8 GW of the new capacity, followed by South Korean and Turkish companies, with the latter dominant in the KRG region.

The majority of the new power plants will be gas-fired, with about 1 GW of diesel generating capacity also scheduled to come online. About 400 megawatts (MW) of wind and solar generating capacity are planned. However, no new hydropower plants are planned because of water shortages. Iraq is also looking to convert older existing gas-fired plants to more efficient combined-cycle plants.

The expansion of generating capacity will be tied to the development of the natural gas industry infrastructure, which is currently lagging. Most current Iraqi natural gas production is flared, and pipelines will need to be built to bring natural gas, which would otherwise be flared, to future power plants.

In addition, Iraq will need to enact regulatory and tariff reforms. Iraq will need to re-examine its current heavy electricity subsidies in order to prevent future demand growth from out-stripping the expansion in generating capacity. New laws for the electric sector have been proposed, but they are still waiting for cabinet approval.

Notes

- Data presented in the text are the most recent available as of April 2, 2013.
- Data are EIA estimates unless otherwise noted.

Sources

- Arab Oil and Gas
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